

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1-33 (canceled).

34 (new): An actuator, comprising:

an actuator chamber including a moveable actuator piston and an actuator rod connected to the actuator piston and retractably extendable from the actuator;

the actuator chamber and actuator piston defining an extended chamber and a retracted chamber separated from the extended chamber by the actuator piston such that the actuator rod extends through the retract chamber;

a fluid supply means arranged to supply fluid simultaneously to both the extend and retract chamber at substantially the same pressure and to reversibly transfer said pressurized fluid between the extended and retracted chambers of the actuator.

35. (new): The actuator according to claim 34, wherein the fluid supply means is operable to control the mutual fluid pressure of the fluid supplied thereby to the extended and retracted chambers to be sufficient to enable the actuator to support a load applied to the actuator in use.

36. (new): The actuator according to claim 34, wherein the fluid supply means is arranged to reversibly transfer said pressurized fluid between the extended and retracted chambers of the actuator, and to separately and independently reversibly transfer said pressurized fluid between the extended chamber and a pressurized fluid store means.

37. (new): The actuator according to claim 34, wherein the fluid supply means is arranged to transfer between the extended and retracted chambers volumes of pressurized fluid substantially equal to a change in the volume of the retracted chamber.

38. (new): The actuator according to claim 37, wherein the fluid supply means is arranged to simultaneously transfer to and from the extended chamber volumes of pressurized fluid substantially equal to the change in the volume of the extended chamber less the concurrent change in the volume of the retracted chamber.

39. (new): The actuator according to claim 34, wherein the fluid supply means includes a first fluid transfer means in fluid communication with the extended chamber and the retracted chamber and arranged to transfer therebetween volumes of fluid substantially equal in magnitude to changes in the volume of the retracted chamber resulting from movement of the actuator piston within the actuator chamber;

and a second fluid transfer means in fluid communication with the extended chamber and operable to transfer to and from the extended chamber volumes of fluid substantially equal in magnitude to the difference between said changes in the volume of the retracted chamber and concurrent changes in the volume of the extended chamber.

40. (new): The actuator according to claim 39, wherein the first fluid transfer means is a reversible first fluid pump, and the second transfer means is a reversible second fluid pump whereby the second pump is arranged to pump fluid at a volumetric rate determined according to the volumetric pump rate of the first pump.

41. (new): The actuator according to claim 40, wherein the actuator chamber, actuator piston and those parts of the actuator rod within the actuator chamber define a retracted chamber of substantially annular volume, whereby the ratio of the concurrent volumetric pump rates of the second and first pumps is substantially equal to the ratio of: changes in the volume of those parts of the actuator rod within the retracted chamber; and, the corresponding changes in the annular volume of the retracted chamber.

42. (new): The actuator according to claim 41, wherein the second fluid transfer means is in fluid communication with a fluid vessel and is arranged to transfer fluid from the extend chamber to the fluid vessel and vice versa, wherein the fluid vessel is arranged to hold fluid received thereby from the second fluid transfer means in a state sufficiently pressurized to generate a back-pressure upon the second fluid transfer means which partially resists the flow of fluid from the second fluid transfer means to the fluid vessel.

43. (new): The actuator according to claim 42, wherein the fluid vessel is a fluid conduit connecting the second fluid transfer means in fluid communication with, and terminating at, a hydraulic accumulator.

44. (new): The actuator according to claim 43, wherein the second transfer means is a reversible fluid pump and said fluid vessel is arranged to generate said back-pressure being sufficient to urge the reversible fluid pump of the second transfer means to back-drive thereby to urge the pump to operate to pump fluid from the fluid vessel to the extend chamber.

45. (new): The actuator according to claim 42, wherein said fluid vessel is operable to be in fluid communication with said first fluid transfer means via said second fluid transfer means.

46. (new): The actuator according to claim 42 including a fluid supply operable to be in fluid communication with and to supply pressurized fluid to said fluid vessel, said first fluid transfer means, said second fluid transfer means, and said actuator chamber.

47. (new): A method of actuation for use with an actuator comprising:

- an actuator chamber containing a moveable actuator piston;
- an actuator rod connected to the actuator piston and retractably extendable from the actuator,
- the actuator chamber and actuator piston defining an extend chamber;
- and a retract chamber separated from the extend chamber by the actuator piston such that the actuator rod extends through the retract chamber, the method including supplying fluid simultaneously to both the extend and retract chamber at substantially the same pressure and reversibly transferring said pressurized fluid between the extend and retract chambers of the actuator.

48. (new): The method according to claim 47 including controlling the mutual fluid pressure of the fluid supplied to the extend and retract chambers to be sufficient to enable the actuator to support a load applied to the actuator in use.

49. (new) The method according to claim 47 including reversibly transferring said pressurized fluid between the extend and retract chambers of the actuator, and separately and independently reversibly transferring said pressurized fluid between the extend chamber and a pressurized fluid store means.

50. (new): The method according to claim 47 including transferring between the extend and retract chambers volumes of pressurized fluid substantially equal to a change in the volume of the retract chamber.

51. (new): The method according to claim 50 including simultaneously transferring to and from the extend chamber volumes of pressurized fluid substantially equal to the change in the volume of the extend chamber less the concurrent change in the volume of the retract chamber.

52. (new): The method according to claim 47 including transferring between the extend chamber and the retract chamber volumes of fluid substantially equal in magnitude to changes in the volume of the retract chamber resulting from movement of the actuator piston within the actuator chamber;

transferring to and from the extend chamber volumes of fluid substantially equal in magnitude to the difference between said changes in the volume of the retract chamber and concurrent changes in the volume of the extend chamber.

53. (new): The method of actuation according to claim 52, wherein fluid is transferred between the extend chamber and the retract chamber by the reversible pumping thereof at a first volumetric pump rate, and fluid is transferred to and from the retract chamber by the reversible pumping thereof at a second volumetric pump rate determined according to the first volumetric pump rate.

54. (new): The method of actuation according to claim 53, wherein the actuator chamber, actuator piston and those parts of the actuator rod within the actuator chamber define a retract chamber of substantially annular volume, whereby the ratio of the concurrent second and first volumetric pump rates is substantially equal to the ratio of: changes in the volume of those parts of the actuator rod within the retract chamber; and, the corresponding changes in the annular volume of the retract chamber.

55. (new): The method of actuation according to claim 52 including holding fluid transferred from, or to be transferred to, the extend chamber in a state sufficiently pressurized to generate a back-pressure which partially resists the transfer of fluid from the extend chamber.

56. (new): The method of actuation according to claim 52 including providing a reversible fluid pump arranged to perform said transfer of fluid to and from the extend chamber by pumping said fluid, and generating said back-pressure to be sufficient to urge the reversible fluid pump to back-drive thereby to urge the pump to operate to pump said held fluid to the extend chamber.

57. (new): The method of actuation according to claim 55 including holding said held fluid in fluid communication with said extend chamber and said retract chamber.

58. (new): The method of actuation according to claim 51 for use in providing simulated motion in a vehicle simulator machine.

59. (new): A motion platform for a vehicle motion simulator machine including an actuator according to claim 34.

60. (new): A vehicle motion simulator including a motion platform according to Claim 59.

61. (new) An actuator according to claim 34, wherein the pressure of the pressurized fluid simultaneously supplied to extend and retract chambers is determined according to the load being experienced by the actuator.

62. (new): The actuator according to claim 34, wherein the pressure of the pressurized fluid simultaneously supplied to extend and retract chambers is determined according to the position/extension of the actuator rod of the actuator.

63. (new): A method of actuation according to claim 47 including supplying the pressurised fluid simultaneously to extend and retract chambers at a fluid pressure determined according to the load being experienced by the actuator.

64. (new): The method according to any of claim 47 including supplying the pressurized fluid simultaneously supplied to extend and retract chambers at a fluid pressure determined according to the position/extension of the actuator rod of the actuator.